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Education:

- 1989** **Ph.D. University of Southern California.** Electrical Engineering. Advisor: Prof. Jerry Mendel, Chair EE-Systems Dept.
- 1983** **M.S. Brigham Young University.** Electrical Engineering. Cum Laude.
- 1982** **B.S. Brigham Young University.** Electrical Engineering. Summa Cum Laude.

Experience:

1990- **Brigham Young University.** Provo, Utah

Professor of Electrical and Computer Engineering. (1999-) Teach undergraduate and graduate courses in electrical engineering. Conduct research in spaceborne scatterometry, synthetic aperture radar, and microwave remote sensing. Mentor undergraduate and graduate students. Mentor new faculty. University, college, and department committee assignments.

Associate Professor of Electrical and Computer Engineering. (1994-99)

Assistant Professor of Electrical and Computer Engineering. (1990-94)

Director, BYU Center for Remote Sensing. (2000-) Coordinate, promote, and direct BYU interdisciplinary remote sensing activities across the University. Manage support staff. Develop academic support program.
<http://www.cers.byu.edu/>

Head, Microwave Earth Remote Sensing (MERS) Laboratory. (1991-) Direct research in microwave remote sensing. Coordinate research and laboratory resources among faculty and students. Manage the acquisition and maintenance of laboratory computer and microwave test equipment. Manage support staff.
<http://www.mers.byu.edu/>

Principal Investigator. (1990-) NASA, NSF, NOAA, and DoD sponsored research projects. Selected titles include "Boundary Layer Modeling of Surface Winds Using NSCAT Data," "Model-Based Wind Retrieval of Wind Fields Using Seasat Scatterometer Data," "High Resolution Imaging of Land and Ice Using SASS Data," "Research in Oceanic Air/Sea Interaction," "Geologic Applications of Small SAR," "Scatterometer Climate Record Pathfinder," "Application and Extension of the Scatterometer Climate Record Pathfinder," "MicroSAR for small UAV." Member of a number of NASA and international science teams.

Instructor, BYU Education Week. (1995-2005) Give 1-3 public lectures per year

1990- **Consultant.** Technical expertise in scatterometer performance and design analysis, radar resolution enhancement, and radar remote sensing. Teach short courses.

- 1983-1990** **Jet Propulsion Laboratory, California Institute of Technology (JPL).**
Pasadena, California.
- Experiment Manager, SCANSCAT Project.*** (1989-90) Senior manager responsible for all technical and programmatic aspects of the SCANSCAT Project in the development and proposal phase. Eventually known as *SeaWinds*, this highly successful \$250 M project resulted in two successful launches and one extended mission (*SeaWinds-on-QuikSCAT*: 1999-present). Managed and coordinated all JPL design and development efforts among staff spread over multiple disciplines at JPL. Prepared and negotiated budgets and technical requirements between JPL, NASA headquarters, other NASA centers, and contractors.
- Project Engineer, Spaceborne Scatterometer Projects Office.*** (1988-90) Senior technical manager for the JPL scatterometer projects office. Responsible for the high level design, analysis, and technical management of the scatterometer projects including instrument design and fabrication, algorithm development and coding for the ground processing system, mission operations, calibration data analysis, system performance analysis, and development and maintenance of system and low-level requirements. Supervised Project Engineering staff. Managed large multi-disciplinary design team. Functioned as interface between scientists, engineering support teams, and upper management.
- Group Leader, Radar Systems Engineering.*** (1988-90) Supervised a staff of 5 radar system engineers involved in the design and performance analysis of JPL flight projects in spaceborne radar remote sensing including the SIR-C and Magellan synthetic aperture radars and the NSCAT, NUSCAT, and SCANSCAT scatterometer missions. Responsibilities included personnel hiring, task assignment, project reporting, and managing and negotiating budgets.
- Principal Investigator.*** (1989-90) NASA-sponsored research project “Model-Based Wind Retrieval of Wind Fields Using Seasat Scatterometer Data.”
- Member Technical Staff.*** (1983-1987) Developed requirements and the high-level design for the NASA Scatterometer (NSCAT) project as the NSCAT Instrument Systems Engineer. Developed performance analysis tools and performed tradeoffs in developing the onboard signal processor design and the ground processing system. Managed technical development in supporting disciplines.
- 1982** **ESL, Inc.** Sunnyvale, California (summer hire)
- Member Technical Staff.*** Studied the effects of bit errors in digital communication channels on the intelligibility of LPC-coded speech.
- 1980-1981** **Timet Corp.** Henderson, Nevada (summer hire)
- Engineer.*** Designed custom analog and digital control systems for high-power vacuum arc furnaces and molten salt electrolytic cells.

Publications:

Seventy-on refereed journal papers and three book chapters. Over 250 conference papers and technical conference presentations. Co-authors include distinguished scientists, faculty members, and students.

Awards:

- 2005** **IEEE *Best Paper of the Year, Trans. Geoscience and Remote Sensing.*** With David W. Draper.
- 2004** **BYU *Sponsored Research Award.*** For outstanding achievement in scholarly activities funded by external sponsors.
- 2004** **Utah County Sheriff *Citizen Service Award.*** For contributions to search and rescue activities.
- 2002** **BYU *Karl G. Maeser Excellence in Research and Creative Arts Award.*** For outstanding research and creative accomplishments.
- 2001** **BYU *Martha Jane Knowlton Coray Professorship.*** To acknowledge senior faculty who are outstanding scholars, teachers, and university citizens.
- 2000** **NASA *Group Achievement Award.*** For outstanding performance in the development, launch and operations of the Quick Scatterometer spacecraft.
- 1997** **NASA *Team Recognition.*** In recognition of proficient advice on scientific requirements during the development of the mission, successful development of methods for optimal data retrieval and outstanding early demonstration of scientific application of NSCAT observations.
- 1986,'88,'91,'91,'92** **NASA *Certificate of Recognition.*** For technical papers on scatterometer instrument design, analysis, and data processing.
- 1986,'88** **NASA *Certificate of Recognition.*** For the development of a sophisticated computer graphics package which was commercially distributed by NASA's Computer Software Management and Information Center (COSMIC). The package was among the center's most popular program packages for several years.

Research Interests:

Microwave remote sensing, spaceborne scatterometry, synthetic aperture radar, speech and signal processing, radar theory, estimation theory, computer graphics, resolution enhancement, scattering theory, polar ice, and mesoscale atmospheric dynamics.

Society Memberships:

Senior Member IEEE (nominated for Fellow), American Geophysical Union, and Tau Beta Pi, Eta Kappa Nu, Phi Kappa Phi, and Sigma Xi honor societies. Currently faculty advisor for Eta Kappa Nu. Past faculty advisor for Tau Beta Pi.

NASA Science Teams:

Past or current member of science teams: *NASA Scatterometer, SeaWinds, Ocean Vector Winds, TRMM, JASON-1, and ESA ERS-2.* Chair of the NSCAT model function subcommittee. Chair of the QuikSCAT/Seawinds Committee on Model Functions.

Students:

One post-doc, eight Ph.D. students completed with five currently in progress, 25 Masters students completed with five in progress. Completed students work in academia, in industry and for government laboratories. Numerous undergraduate students were also mentored as research students.

Major Research Grants:

Over 30 externally funded research grants totaling approximately \$7M. Sponsors include NASA, NSF, DoD, and NOAA.

Selected Journal Publications (* denotes student authors)

- J. Piepmeir, E.G. Njoku, and D.G. Long "Stokes Antenna Temperatures," to appear, *IEEE Transactions on Geoscience and Remote Sensing*, 2007.
- H. Stephen and D.G. Long, "Spatial and Temporal Behavior of Microwave Backscatter Directional Modulation Over the Saharan Ergs," *IEEE Transactions on Geoscience and Remote Sensing*, Vol. 45, No. 5, pp. 1164-1173, 2007.
- C. Nie and D.G. Long, "A C-band Wind/Rain Backscatter Model," *IEEE Transactions on Geoscience and Remote Sensing*, Vol. 45, No. 3, 621-631, 2007.
- I.S. Ashcraft and D.G. Long, "Comparison of Methods for Melt Detection over Greenland using Active and Passive Microwave Measurements," *International Journal of Remote Sensing*, Vol. 27, No. 12, pp. 2569-2488, 2006.
- I.S. Ashcraft and D.G. Long, "Relating Microwave Backscatter Azimuth Modulation to Surface Properties of the Greenland Ice Sheet," *Journal of Glaciology*, Vol. 52, No. 177, pp. 257-266, 2006.
- L.B. Kunz and D.G. Long, "Melt Detection in Antarctic Ice-Shelves Using Spaceborne Scatterometers and Radiometers," *IEEE Transactions on Geoscience and Remote Sensing*, Vol. 44, No. 9, pp. 2461-2469, 2006.
- J.R. Allen and D.G. Long, "Microwave Observations of Daily Antarctic Sea-Ice Edge Expansion and Contraction Rates," *Geoscience and Remote Sensing Letters*, Vol. 3, No. 1, pp. 54-58, 2006.
- H. Stephen and D.G. Long, "Modeling Microwave Emissions of Erg Surfaces in the Sahara Desert," *IEEE Transactions on Geoscience and Remote Sensing*, Vol. 43, No. 12, pp. 2822-2830, 2005.
- J.R. Allen and D.G. Long, "An Analysis of SeaWinds-Based Rain Retrieval in Severe Weather Events," *IEEE Transactions on Geoscience and Remote Sensing*, Vol. 43, No. 12, pp. 2870-2878, 2005.
- L.B. Kunz and D.G. Long, "Calibrating SeaWinds and QuikSCAT Scatterometers Using Natural Land Targets," *Geoscience and Remote Sensing Letters*, Vol. 2, No. 2, pp. 182-186, 2005.
- I.S. Ashcraft and D.G. Long, "Differentiation Between Melt and Freeze Stages of the Melt Cycle Using SSM/I Channel Ratios," *IEEE Transactions on Geoscience and Remote Sensing*, Vol. 43, No. 6, pp. 1317-1323, 2005.
- H.S. Anderson and D.G. Long, "Sea Ice Mapping Method for SeaWinds," *IEEE Transactions on Geoscience and Remote Sensing*, Vol. 43, No. 3, pp. 647-657, 2005.
- I.S. Ashcraft and D.G. Long, "Observation and Characterization of Radar Backscatter over Greenland," *IEEE Transactions on Geoscience and Remote Sensing*, Vol. 43, No. 2, pp 237-246, 2005.
- I.S. Ashcraft* and D.G. Long, "Observation and Characterization of Radar Backscatter over Greenland," *IEEE Transactions on Geoscience and Remote Sensing*, Vol. 43, No. 2, pp 237-246, 2005.
- H. Stephen* and D.G. Long, "Microwave Backscatter Modeling of Erg Surfaces in the Sahara Desert," *IEEE Transactions on Geoscience and Remote Sensing*, Vol. 43, No. 2, pp. 238-247, 2005.
- D.G. Long, M.W. Spencer, and E.G. Njoku, "Spatial Resolution and Processing Tradeoffs for HYDROS: Application of Reconstruction and Resolution Enhancement Techniques," *IEEE Transactions on Geoscience and Remote Sensing*, Vol. 43, No. 1, pp. 3-12, 2005.
- J. Etcheto, E. Dinnat, J. Boutin, A. Camps, J. Miller, S. Contardo, J. Wesson, J. Font, and D.G. Long, "Wind Speed Effect on L-band Brightness Temperature Inferred from EuroSTARRS and WISE 2001 Field Experiments," *IEEE Transactions on Geoscience and Remote Sensing*, Vol. 42, No. 10, 2004.
- J. Harpainter, R.T. Tonboe, D.G. Long and M. L. VanWoert, "Automatic Detection and Validity of the Sea Ice Edge: An Application of Enhanced Resolution QuikScat/SeaWinds Data," *IEEE Transactions on Geoscience and Remote Sensing*, Vol. 42, No. 7, pp. 1433-1443, 2004.
- P.K. Yoho* and D.G. Long, "Correlation and Covariance of Satellite Scatterometer Measurements," *IEEE Transactions on Geoscience and Remote Sensing*, Vol. 42, No. 6, pp. 1176-1187, 2004.
- D.W. Draper* and D.G. Long, "Simultaneous Wind and Rain Retrieval Using SeaWinds Data," *IEEE Transactions on Geoscience and Remote Sensing*, Vol. 42, No. 7, pp. 1411-1423, 2004.

- D.W. Draper* and D.G. Long, "Assessing the Quality of SeaWinds Rain Measurements," *IEEE Transactions on Geoscience and Remote Sensing*, Vol. 42, No. 7, pp. 1424-1432, 2004.
- D.W. Draper* and D.G. Long, "Evaluating the Effect of Rain on SeaWinds Scatterometer Measurements," *Journal of Geophysical Research*, Vol. 109, No. C02005, doi:10.1029/2002JC001741, 2003.
- P.K. Yoho* and D.G. Long, "An Improved Scatterometer Simulation Model for Spaceborne Scatterometer Measurements," *IEEE Transactions on Geoscience and Remote Sensing*, Vol. 41, No. 11, pp. 2692-2695, 2003.
- Q.P. Remund* and D.G. Long, "Large-scale Inverse Ku-band Backscatter Modeling of Sea Ice," *IEEE Transactions on Geoscience and Remote Sensing*, Vol. 41, No. 8, pp. 1821-1833, 2003.
- D.W. Draper* and D.G. Long, "An Advanced Ambiguity Selection Algorithm for SeaWinds," *IEEE Transactions on Geoscience and Remote Sensing*, Vol. 41, No. 3, pp. 538-547, 2003.
- M.W. Spencer*, W-Y Tsai, and D.G. Long, "High Resolution Measurements with a Spaceborne Pencil-Beam Scatterometer Using Combined Range/Doppler Discrimination Techniques," *IEEE Transactions on Geoscience and Remote Sensing*, Vol. 41, No. 3, pp. 567-581, 2003.
- D.W. Draper* and D.G. Long, "An Assessment of SeaWinds on QuikSCAT Wind Retrieval," *Journal of Geophysical Research*, Vol. 107, No. C12, pp. 3212-3226, Dec. 2002.
- D.G. Long, Jarom Ballantyne*, and C. Bertoia, "Is the Number of Icebergs Really Increasing?" *EOS, Transactions of the American Geophysical Union*, Vol. 83, No. 42, pp 469 & 474, 15 Oct. 2002.
- Y. Zhao, A.K. Liu, and D.G. Long, "Validation of Sea Ice Motion from QuikSCAT with Those from SSM/I and Buoy," *IEEE Transactions on Geoscience and Remote Sensing*, Vol. 40, No. 6, pp. 1241-1246, 2002.
- B.E. Barrowes* and D.G. Long, "Evaluation of a Compound Probability Model with Tower-Mounted Scatterometer Data," *IEEE Transactions on Geoscience and Remote Sensing*, Vol. 40, No.1, pp. 42-49, 2002.
- D.G. Long, M.R. Drinkwater, B. Holt, S. Saatchi, and C. Bertoia, "Global Ice and Land Climate Studies Using Scatterometer Image Data," *EOS, Transaction of the American Geophysical Union*, Vol. 82, No. 43, pg. 503, 23 Oct. 2001. Includes *EOS Electronic Supplement*: http://www.agu.org/eos_elec/010126e.html
- R.R. Forster, D.G. Long, K.C. Jezek, S.D. Drobot, and M.R. Anderson, "The Onset of Arctic Sea-Ice Snowmelt as Detected with Passive- and Active-microwave Remote Sensing," *Annals of Glaciology*, Vol. 33, pp. 85-93, 2001.
- M.R. Drinkwater, D.G. Long, and A.W. Bingham, "Greenland Snow Accumulation Estimates from Scatterometer Data," *Journal of Geophysical Research*, PARCA Special Issue, Vol. 106, No. D24, pp. 33935-33950, 2001.
- D.S. Early* and D.G. Long, "Image Reconstruction and Enhanced Resolution Imaging from Irregular Samples," *IEEE Transactions on Geoscience and Remote Sensing*, Vol. 39, No. 2, pp. 291-302, 2001.
- Q.P. Remund*, D.G. Long, and M.R. Drinkwater, "An Iterative Approach to Multisensor Sea Ice Classification," *IEEE Transactions on Geoscience and Remote Sensing*, Vol. 38, No. 4, pp. 1843-1856, 2000.
- D.G. Long and M.R. Drinkwater, "Azimuth Variation in Microwave Scatterometer and Radiometer Data Over Antarctica," *IEEE Transactions on Geoscience and Remote Sensing*, Vol. 38, No. 4, pp. 1857-1870, 2000.
- M.W. Spencer*, C. Wu, and D.G. Long, "Improved Resolution Backscatter Measurements with the SeaWinds Pencil-Beam Scatterometer," *IEEE Transactions on Geoscience and Remote Sensing*, Vol. 38, No. 1, pp.89-104, 2000.
- J. Zec*, W.L. Jones, and D.G. Long, "NSCAT Normalized Radar Backscattering Coefficient Biases Using Homogenous Land Targets," *Journal of Geophysical Research*, Vol. 184, No. C5, pp. 11557-11568, 1999.
- T. Oliphant* and D.G. Long, "Accuracy of Scatterometer-Derived Winds Using the Cramer-Rao Bound," *IEEE Transactions on Geoscience and Remote Sensing*, Vol. 37, No. 6, pp. 2642-2652, 1999.
- Q.P. Remund* and D.G. Long, "Sea Ice Extent Mapping Using Ku-Band Scatterometer Data," *Journal of Geophysical Research*, Vol. 104, No. C5, pp. 11515-11527, 1999.
- A.E. Gonzales* and D.G. Long, "An Assessment of NSCAT Ambiguity Removal," *Journal of Geophysical Research*, Vol. 104, No. C5, pp. 11449-11457, 1999.
- D.G. Long and M.R. Drinkwater, "Cryosphere Applications of NSCAT Data," *IEEE Transactions Geoscience and Remote Sensing*, Vol. 37, No. 3, pp. 1671-1684, 1999.
- W-Y Tsai, J.E. Graf, C. Winn, J.N. Huddleston, S. Dunbar, M.H. Freilich, F.J. Wentz, D.G. Long, and W.L. Jones, "Post-launch Sensor Verification and Calibration of the NASA Scatterometer," *IEEE Transactions on Geoscience and Remote Sensing*, Vol. 37, No. 3, pp. 1517-1542, 1999.
- P.J. Johnson* and D.G. Long, "The Probability Density of Spectral Estimates Based on Modified Periodogram Averages," *IEEE Transactions on Signal Processing*, Vol. 47, No. 5, pp. 1255-1261, 1999.
- D.G. Long, Q.P. Remund*, and D.L. Daum*, "A Cloud-Removal Algorithm for SSM/I Data," *IEEE Transactions on Geoscience and Remote Sensing*, Vol. 37, No. 1, pp. 54-62, 1999.
- J. Graf, C. Sasaki, C. Winn, W.T. Liu, W. Tsai, M. Freilich and D. Long, "NASA Scatterometer Experiment," *Acta Astronautica*, Vol. 43, No. 7-8, pp. 377-407, 1998.
- D.G. Long, and D.L. Daum, "Spatial Resolution Enhancement of SSM/I Data," *IEEE Transactions on Geoscience and Remote Sensing*, Vol. 35, No. 2, pp. 407-417, 1998.

- D. S. Early* and D.G. Long, "Azimuth Modulation of C-band Scatterometer sigma-0 Over Southern Ocean Sea Ice," *IEEE Transactions on Geoscience and Remote Sensing*, Vol. 35, No. 5, pp. 1201-1209, Sept. 1997.
- M.W. Spencer*, C. Wu, and D.G. Long, "Tradeoffs in the Design of a Spaceborne Scanning Pencil-beam Scatterometer," *IEEE Transactions on Geoscience and Remote Sensing*, Vol. 35, No. 1, pp. 115-126, Jan. 1997.
- D.G. Long and M.W. Spencer, "Radar Backscatter Measurement Accuracy for a Spaceborne Pencil-Beam Wind Scatterometer with Transmit Modulation," *IEEE Transactions on Geoscience and Remote Sensing*, Vol. 35, No. 1, pp. 102-114, Jan. 1997.
- D.G. Long, R.S. Collyer*, R. Reed*, and D.V. Arnold, "Dependence of the Normalized Radar Cross Section of Water Waves on Bragg Wavelength--Wind Speed Sensitivity," *IEEE Transactions on Geoscience and Remote Sensing*, Vol. 34, No. 3, pp. 656-666, May 1996.
- D.G. Long and G.B. Skouson*, "Calibration of Spaceborne Scatterometers Using Tropical Rainforests," *IEEE Transactions on Geoscience and Remote Sensing*, Vol. 34, No. 2, pp. 413-424, Mar. 1996.
- P. J. Hardin and D. G. Long, "Integrating Reconstructed Scatterometer and Advanced Very High Resolution Radiometer Data for Tropical Forest Inventory," *Optical Engineering*, Vol. 34, No. 11, pp. 3146-3153, Nov. 1995.
- D. G. Long and M.R. Drinkwater, "Greenland Observed at High Resolution by the Seasat-A Scatterometer," *Journal of Glaciology*, Vol. 32, No. 2, pp. 213-230, 1994.
- D. G. Long and P. Hardin, "Vegetation Studies of the Amazon Basin Using Enhanced Resolution Seasat Scatterometer Data," *IEEE Transactions on Geoscience and Remote Sensing*, Vol. 32, No. 2, pp. 449-460, Mar. 1994.
- D. G. Long, "Wind Field Model-Based Estimation of SEASAT Scatterometer Winds," *Journal of Geophysical Research*, Vol. 98, No. C8, pp. 14,651-14,668, 1993.
- D. G. Long, P. Hardin, and P. Whiting*, "Resolution Enhancement of Spaceborne Scatterometer Data," *IEEE Transactions on Geoscience and Remote Sensing*, Vol. 31, No. 3, pp. 700-715, May 1993.
- D. G. Long and D. Arnold, "Observational Research in Air/Sea Interaction," Invited Paper, *Remote Sensing Reviews*, Vol. 8, pp. 189-194, 1993.
- F. Naderi, M. H. Freilich, and D. G. Long, "Spaceborne Radar Measurement of Wind Velocity Over the Ocean--An Overview of the NSCAT Scatterometer System," invited paper, *Proceedings of the IEEE*, pp. 850-866, Vol. 79, No. 6, June 1991.
- D. G. Long and J. M. Mendel, "Identifiability in Wind Estimation from Wind Scatterometer Measurements," *IEEE Transactions on Geoscience and Remote Sensing*, Vol. 29, No. 2, pp. 268-276, 1991.
- S. J. Shaffer, R.S. Dunbar, S. V. Hsiao, and D.G. Long, "A Median-Filter-Based Ambiguity Removal Algorithm for NSCAT," *IEEE Transactions on Geoscience and Remote Sensing*, Vol. 29, No. 1, pp. 167-174, Jan. 1991.
- D. G. Long and J. M. Mendel, "Model-Based Estimation of Wind Fields over the Ocean From Scatterometer Measurements Part I: The Wind Field Model," *IEEE Transactions on Geoscience and Remote Sensing*, Vol. 28, No. 2, pp. 349-360, May 1990.
- D. G. Long and J. M. Mendel, "Model-Based Estimation of Wind Fields over the Ocean From Scatterometer Measurements Part II: Estimation of the Model Parameters," *IEEE Transactions on Geoscience and Remote Sensing*, Vol. 28, No. 2, pp. 361-373, May 1990.
- D. G. Long, "Exact Computation of the Unwrapped Phase of a Finite-Length Time Series," *IEEE Transactions on Acoustics, Speech, and Signal Processing*, Vol. 36, No. 11, pp. 1787-1790, Nov. 1988.
- D. G. Long, C-Y Chi, and F. K. Li, "The Design of an Onboard Digital Doppler Processor for a Spaceborne Scatterometer," *IEEE Transactions on Geoscience and Remote Sensing*, Vol. 26, No. 6, pp. 869-878, Nov. 1988.
- C-Y Chi, D. G. Long, and F. K. Li, "Roundoff Noise Analysis for Digital Signal Power Processors Using Welch's Spectrum Estimation," *IEEE Transactions on Acoustics, Speech, and Signal Processing*, Vol. ASSP-35, No. 6, June 1987.
- C-Y Chi, D. G. Long and F. K. Li, "Radar Backscatter Measurement Accuracies Using Digital Doppler Processors in Spaceborne Scatterometers," *IEEE Transactions on Geoscience and Remote Sensing*, Vol. GE-24, No. 3, May 1986.

Book Chapters

- D.G. Long, "Reconstruction and Resolution Enhancement Techniques for Microwave Sensors," in C.H. Chen (ed.), *Frontiers of Remote Sensing Information Processing*, World Scientific Publishing Co., 2003.
- D.P. Winebrenner, D. G. Long, and B. Holt, "Automatable Observation of Seasonal Transitions on Arctic Sea Ice Using Synthetic Aperture Radar," in C. Tsatsoulis and R. Kwok (eds), *Recent Advances in the Analysis of SAR for Studies in the Polar Oceans*, Springer-Verlaser, pgs. 129-144, 1998.

D.W. Parry, D.V. Arnold, D.G. Long, S.R. Woodward, "The Dead Sea Scrolls and New Technological Advances: DNA, Electronic Database, and Imaging Radar," for P.W. Flint and J.C. Vanderkam (eds.), *The Dead Sea Scrolls Jubilee Collection*, E.J. Brill, Vol. 1, pg. 496-515, 1998.